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# Availability of Pulses in Rural Karnataka

## Need to Use District-level Data

CHRISTOPHER M COGHLAN, SHONIL A BHAGWAT

In a response to “Making Pulses Affordable Again” (*EPW*, 7 January 2017) by P K Joshi, Avinash Kishore and Devesh Roy this article aims to bring to the fore the importance of using district-level data on nutritional levels and pulse production, that can better inform public policy and help improve human development indicators.

Joshi et al (2017) identify the need to increase the production of pulses in India as a key policy priority. As a cost-effective protein source, an increase in the availability of pulses and their consumption, particularly by individuals below the poverty line (BPL), can address the nutritional security of some of the poorest people in India. We therefore agree with Joshi et al’s overall recommendation that state governments, across India, need to introduce policies that increase the production and availability of pulses. However, Joshi et al’s analysis based on state-level data, does not answer the question of where the greatest need and the greatest potential lies, to increase the production and consumption of pulses. We argue that in order to implement Joshi et al’s recommendations, Indian states will need to consider district-level data on nutrition deficiencies and yield potential of pulses.

Based on our analysis of Karnataka, we suggest that it is essential to identify district-level “hotspots” of (i) nutrition deficiencies, and (ii) pulse production potential. Some academics have suggested that identifying undernourished districts is necessary, prior to enacting interventions (Desai and Vanneman 2014). Furthermore, Karnataka is a rapidly urbanising state with significant urban and rural inequality (Ghori 2015).

### Research Design

Our analysis compares rural district information in Karnataka with international-level data for absolute household expenditure on food (income), adult literacy rate (education) and the percentage of pregnant women with anaemia (health)—in order to identify areas where nutritional deficiencies are at their worst. We then identify the pulse production potential of

districts in Karnataka. As shown by Joshi et al (2017: 38–39), amongst all the states in India, Karnataka enjoys a relatively large area of land allocated for chickpea (fourth) and pigeon pea (second) cultivation in 2014–15, and from 2001 to 2010 the percentage increase in area under cultivation, was also significant for chickpea (second) and pigeon pea (first) crops. Furthermore the Karnataka Comprehensive Nutrition Mission (India’s first) benefits from its links to the state’s department of agriculture and opportunities for constructing agriculture-nutrition interventions are evident (Paarlberg 2012).

The following expands on the suggestion made by Joshi et al (2017: 43) for an increased production of pulses within pulse producing areas in cooperation with the *har khet ko paani* (water to every farm) programme, by highlighting the districts of Karnataka with the best pulse production yield(s).

### Nutritional Deficiencies

Drawing on the United Nations Development Programme’s (UNDP) Human Development Index (HDI), we created a Nutritional HDI for Karnataka using district-level data. The data refers to 2011–12, the latest year of availability. The three districts (Yadgir, Chikballapur and Ramanagara) for which data was unavailable were excluded from our analysis. The three dimensions of HDI as defined by the UNDP are income, health and education (UNDP India 2011). Suitable proxies were input into the HDI framework and compared against the international minimum and maximum for each component.

Nutritional HDI Component (e.g. Income/Health/Education):

$$\frac{\text{Karnataka Nutritional HDI Component} - \text{Minimum}}{\text{Maximum} - \text{Minimum}} = \text{Nutritional HDI Component Score.}$$

$$\sqrt[3]{\text{Nutritional HDI Income} + \text{Nutritional HDI Health} + \text{Nutritional HDI Education}} = \text{Nutritional HDI Score.}$$

(i) Income was captured by the absolute annual—converted from monthly data—household expenditure on food (NSS 2014). The percentage of food expenditure in

Christopher M Coghlan ([christopher.coghlan@ouce.ox.ac.uk](mailto:christopher.coghlan@ouce.ox.ac.uk)) is pursuing a DPhil at the School of Geography and the Environment, University of Oxford. Shonil A Bhagwat ([shonil.bhagwat@linacre.ox.ac.uk](mailto:shonil.bhagwat@linacre.ox.ac.uk)) teaches at the School of Geography and the Environment, University of Oxford and at the Department of Geography, The Open University.

relation to the total household expenditure is an established metric (FAO 2015). An absolute figure was used to ensure parity across districts between food expenditure and total household expenses (NSS 2014).

(ii) Pregnant and lactating women consistently have the most significant protein deficiencies among vulnerable groups in India (NNMB 2013). The use of anaemia as a nutrition proxy is valid, due to the link between iron deficiency (the most common deficiency) and anaemia (UNICEF/UNU/WHO 2001). The health component was captured by obtaining figures for the percentage of pregnant women with anaemia (MHFW 2013).

(iii) Education was captured by the literacy rate of people over seven years of age (MHFW 2013). Research maintains that poor nutrition is linked to unsatisfactory learning outcomes and a loss of productivity (Spears 2013). Nutritional HDI scores are summarised in Table 1.

(iv) Scores were recorded, across the following categories of increasing severity:  $>0.48$  = Adequate;  $0.45-0.499$  = Slightly Inadequate;  $0.40-0.449$  = Moderately Inadequate;  $0.35-0.399$  = Significantly Inadequate;  $0.30-0.349$  = Severely Inadequate; and  $<0.30$  = Alarming Inadequate. All HDI scores  $<0.48$  are considered low by the UNDP (2011).

### Pulse Production

- Production yield figures for pulses were obtained from the *Report on Area, Production and Prices of Agricultural Crops in Karnataka 2009-10* (Directorate of Economics and Statistics 2012). These yield figures, corresponding to six levels of productivity, are based on kilogram/hectare yield levels for pulses: 1 =  $>700$ ; 2 = 600 to 699.99; 3 = 500 to 599.99; 4 = 400 to 499.99; 5 = 300 to 399.99; and 6 =  $<300$ .

### Results

The results demonstrate that an adequate Nutritional HDI score is present only in the district of Uttara Kannada (Table 1). There is, however, the potential for Karnataka to use its statewide resources to increase the production of pulses strategically and transfer them to areas where nutritional deficiencies are severe. Table 1 illustrates that pulse productivity yields are high in the five southern districts of

Bengaluru rural, Bengaluru urban, Kolar, Chamarajanagar and Chikmagalur. In general, district exports could vary based on Nutritional HDI with Davanagere, Chitradurga, Chikmagalur and Mysore being in the most advantageous positions.

**Table 1: Summary of Karnataka Rural District Ratings**

Karnataka District	Nutritional HDI Score	Production Score Pulses
Uttara Kannada	$>.48$	5
Kodagu	$.45-.479$	5
Belgaum		5
Chitradurga		3
Gadag	$.40-.449$	6
Haveri		5
Shimoga		5
Bellary		5
Bijapur		5
Chikmagalur		2
Davanagere	$.35-.399$	1
Gulbarga		4
Koppal		5
Mysore		3
Bagalkot		4
Bidar		4
Chamarajanagar		2
Dakshina Kannada		6
Dharwad	$.30-.349$	3
Hassan		4
Kolar		2
Raichur		4
Tumkur		3
Udupi		4
Bengaluru rural		1
Bengaluru urban	$<.30$	2
Mandya		4

Agglomerations (largely neglected by India) could situate producers in close proximity to relevant industries (Duslund et al 2015) in the urban centres of Bengaluru and Mysore, which as core nodes would provide complimentary services in the financial, transportation and technology sectors (Lall et al 2001). The remaining districts should aim to collaborate with their neighbours and import pulses from producer districts that are in close proximity. For example, six of the nine most northerly districts (Bagalkot, Bidar, Raichur, Bijapur, Gulbarga and Koppal) suffer from significantly or severely inadequate Nutritional HDI scores and have pulse production yield scores of either four or five; the two lowest categories (Table 1). These districts will need significant assistance in increasing their pulse production.

Our analysis complements the work of Joshi et al (2017) by suggesting that an opportunity exists to develop district-based increases in pulse production in Karnataka. The strategies outlined above,

would assist in channelling the resources of the “water to every farm” initiative most effectively. The Nutritional HDI informs us about distribution recommendations and when supported by district-level scores, can make increases in the availability of pulses to the most vulnerable sections of the state’s rural population, a key policy priority. Karnataka’s unique position in India makes it an ideal case study to trigger future policy uptake for increasing pulse production elsewhere.

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